

Appl. No. 10/009,466  
Amdt. dated Jun. 27, 2005  
Reply to Office Action of March 25, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of claims:**

Claim 1 (currently amended): A fixed bed reactor for gas involving exothermic catalytic reactions ~~reaction~~, said reactor comprising:

a longitudinal outer chamber having a proximate longitudinal end and a distal longitudinal end; said outer chamber including a reactor inlet near said proximate longitudinal end; and

a longitudinal inner chamber mounted in said outer chamber and having a proximate end and a distal end; said inner chamber including a reactor outlet at said proximate longitudinal end; said inner chamber including a) a first section located near said proximate longitudinal end and being thermally coupled to said outer chamber, b) a second section located near said distal longitudinal end and being in fluid communication with both said outer chamber and said first section, and c) a third section located between said first and second sections ~~and being thermally insulated from said outer chamber;~~

whereby, in operation, when gas enters said outer chamber through said inlet, said gas is heated to the ignition temperature of the gas by the heat coming from said first section of said inner chamber, and is forced to flow in said outer chamber in a first direction from said proximate end to said distal end; said gas then flows in said inner chamber from said distal end to said proximate end thereof, exiting through said outlet, the reactor thereby using heat it itself generates to self-regulate exothermic reactions, and being operatable in a range of position and orientation from an horizontal position to a vertical position.

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**Claim 2 (original):** A reactor as recited in claim 1, wherein said reactor further comprising an auxiliary heating means and wherein the operation of said reactor is initiated by preheating the entering gas to the ignition temperature of said gas using said auxiliary heating means.

**Claim 3 (original):** A reactor, as recited in claim 1, wherein at least one of said outer chamber and said inner chamber is cylindrical.

**Claim 4 (original):** A reactor, as recited in claim 1, wherein said outer and inner chambers are generally concentric.

**Claim 5 (original):** A reactor, as recited in claim 1, wherein said first section of said inner chamber is thermally coupled to said outer chamber via fins.

**Claim 6 (original):** A reactor, as recited in claim 1, wherein said second section of said inner chamber includes an aperture for fluid communication with said outer chamber.

**Claim 7 (original):** A reactor, as recited in claim 1, wherein said third section of said inner chamber is covered with an insulating material.

**Claim 8 (original):** A reactor, as recited in claim 1, wherein said first section of said inner chamber includes at least one of said catalytic particles, catalytic pellets and sand.

**Claim 9 (original):** A reactor, as recited in claim 1, wherein said third section of said inner chamber includes at least one of said catalytic particles, catalytic pellets and sand.

**Claim 10 (original):** A reactor, as recited in claim 1, wherein said outer chamber includes at least one of said catalytic particles, catalytic pellets and sand.

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Claim 11 (original): A reactor, as recited in claim 1, wherein said first section of said inner chamber includes catalytic particles, said second section of said inner chamber includes catalytic pellets and said outer chamber includes sand and mixtures of sand and catalytic pellets.

Claim 12 (original): The use of the reactor of claim 1 to heat air.

Claim 13 (original): The use of the reactor of claim 1 for catalytic cleaning of gas streams containing combustible gases.

Claim 14 (original): The use of the reactor of claim 1 for production of sulfur trioxide.

Claim 15 (original): The use of the reactor of claim 1 for the production of energy by the combustion of biogas.

Claim 16 (original): The use of the reactor of claim 1 for partial oxidation of hydrocarbons.